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WITH

REMARKS ON THE

STRUCTURE AND FORMATION

OF THE

MEMBRANES OF THE HUMAN OVUM.

By ROBERT LEE, M.D. F.R.S. Secretary.
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A DESCRIPTION OF THE APPEARANCES OBSERVED IN A CASE OF DOUBLE UTERUS, IN WHICH IMPREGNATION HAD TAKEN PLACE, WITH REMARKS ON THE STRUCTURE AND FORMATION OF THE MEMBRANES OF THE HUMAN OVUM.

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On the 2d of August, 1831, I was present with Dr. Sims and Mr. Morley of Leicester Square, at the examination of the body of a woman who had died eight days subsequent to parturition, from inflammation of the peritoneum, appendages and veins of the uterus. She had previously borne several living children, but nothing unusual occurred during labour

on any of these occasions. The uterine organs were found on dissection to be malformed, and several remarkable appearances were observed in their structure, of which the following is a short history. The accompanying preparation of the parts, with a drawing and model in wax, will enable the members of the Society to verify the accuracy of the description *.

The body of the uterus was cleft as it were down the middle, from the fundus to the cervix, so as to form two lateral halves which opened into the cervix, like the uterine cornua of most mammiferous animals. The cervix, os uteri, and vagina presented the ordinary appearances observable at the same period after delivery. The right cornu had contained the fœtus, and it did not differ perceptibly in its form and size from the uterus in common cases a week after delivery. Coagula of the fibrine of the blood were found closing the semilunar orifices of the uterine sinuses, and the whole inner surface was lined with rough irregular flakes, of deciduous membrane, or a layer of the fibrine of the blood. One ovarium and one Fallopian tube were connected with this cornu, and the same was the case with the unimpregnated cornu. Both ovaria were enlarged, but the right was much larger than the left, and contained a corpus luteum. In the left ovarium no corpus luteum existed.

* See Plate II.

The left cornu was about the ordinary size of the unimpregnated uterus. Its parietes when divided were observed to be unusually soft and vascular, and its internal surface was every where coated with a delicate and beautifully formed deciduous membrane. At the opening of the cornu into the cervix, the deciduous membrane formed a shut sac, but it presented a smooth circular opening at the uterine orifice of the Fallopian tube. The fibres of this membrane as they approached the opening of the tube, ran in a converging direction like radii to the centre of a circle, and passed into the opening, leaving it completely pervious, although of the ordinary small dimensions. The distance to which the fibres of the deciduous membrane extended into the Fallopian tube could not be clearly ascertained, nor was it positively determined if the whole extent of the canal of the tube was open.

In the works of different authors, various irregularities in the formation of the human uterus have been described, under the terms bilocular, bicorned, bifid or double uterus, in all of which, without a single exception, the uterine appendages have been simple, or have consisted of one ovarium and one Fallopian tube annexed to each cornu of the uterus, and not of two ovaria and two Fallopian tubes, as the term double uterus would seem to imply. In the examination of a great number of children at the Maternité of Paris, the division of the uterus, as in the case now related, was often met with. Professor Chaus-

sier has described the case of a woman who was delivered in the Maternité of her tenth child, in whom it was found after death, that the right side of the uterus existed, with one ovarium and one Fallopian tube*. Littre, in dissecting the body of a little girl, found the vagina divided by a fleshy perpendicular septum into two equal cavities. Vallisneri relates the history of a woman who was poisoned by cantharides, in whom two uteri were found to exist, one of which opened into the vagina, the other into the rectum †. M. Cassan has referred to numerous other examples of similar malconformations of the uterine organs, and to those more particularly which are contained in the Memoirs of the Royal Academy of Sciences ‡. In the Museum of the Royal College of Surgeons, there is a specimen of bifid unimpregnated uterus, and another was preserved in the collection of Mr. Brookes, in which the fundus, cervix, and os uteri, were all divided by a thick septum.

The whole of these malformations have been reduced to the four following varieties, which have been accurately delineated by Messrs. Lauth and Cruvelhier. 1st. Where the uterus and vagina are separated into two cavities by a septum running in the direction of the mesial line, while the external confi-

* Bulletin de la Faculté de Médecine, Paris, 1817.

† Esperienze ed Osservazione spettanti all' Istoria Naturale, &c. l. 4.

‡ Recherches sur les cas d'Uterus Double et de Superfœtation ; par A. L. Cassan. Paris, 1828.

guration of the uterine organs presents nothing unusual. 2dly, Where the fundus and body of the uterus were divided into two cornua; the cervix, os uteri, and vagina remaining in the normal state. 3dly, Where the uterus is bifid, as above, while the cervix and vagina are also divided by a septum. 4thly, Where the vagina forms a single canal with a double os uteri.

All these deviations from the natural formation of the uterus, have been referred by Meckel to a suspension of the development of the parts, in consequence of which the uterine organs manifest, during the whole of life, some of the conditions peculiar to the embryonic state. This principle, indeed, explains some of these varieties of malformation, as for example, those which have been classed by Blumenbach under his genus of monstra per defectum; but in the cases where redundant parts are met with, it is wholly inapplicable, and physiologists cannot at present account for these in a satisfactory manner.

Morand, Bartholin, Tiedemann, Ollivier, and Dr. Blundell relate cases of double uterus, in which impregnation had taken place, and the fœtus had been retained till the full period. None of these authors have alluded to the presence of a deciduous membrane in the unimpregnated cornu of the uterus: but that it is formed in all similar cases, appears probable from this circumstance, that in the gravid uterus of the lower animals, the membrane which surrounds

the product of conception, invariably occupies the whole inner surface of both cornua.

The disposition of the deciduous membrane, in the case I have now related, must have rendered superfœtation, or the conception of a second embryo during gestation, impossible, and its history tends entirely to overturn the recent speculations of M. Cassan also, on the possibility of superfœtation where a double uterus exists. Menstruation must have been equally impossible in this case, as in ordinary pregnancy, where the inner surface of the uterus is lined with decidua.

The most remarkable example of impregnated double uterus which has perhaps ever occurred, is the following, which has been recorded by Dr. Purcell, of Dublin, in the Philosophical Transactions, Vol. LXIV. p. 474.

"Last summer (1773) the body of a woman who had died in labour, in the ninth month of pregnancy, was dissected in the Anatomical Theatre of Trinity College. Upon opening the abdomen, an uterus appeared of such a size and form as is usually observed at that period. It contained a full grown fœtus, but was furnished with only one ovarium, and one Fallopian tube, which were situated on the right side. On the left was placed a second uterus, unimpregnated, and of the usual size, to which the other ovarium and tube were annexed. But these two uteri were

wholly distinct and separated from each other, except at the lower extremity of their necks, where their union extended a quarter of an inch, and an acute angle was formed between. There was nothing extraordinary in the formation of the external parts of generation; but from each side of the meatus urinarius a membrane ran downwards, and the two having comprehended this orifice between them, were joined together a little below it, so as to form by their union a septum or mediastinum, which taking the remainder of its origin from all that hard ridge called the superior columna, so as to extend from the entrance of the vagina as far backwards as its posterior, and thus divide it into two tubes of nearly equal dimensions. But each of these did not lead to the womb of its own side; for the right vagina became gradually wider as it ran backwards, and at last was so far dilated as to comprehend within its circumference the orifices of both uteri, while that on the left side having taken an oblique direction, ended in a cul de sac or cœcum."

The preparation of the parts thus described, was afterwards purchased by Mr. Hunter, and is now in the Museum of the Royal College of Surgeons in London, and forms one of the most valuable specimens in the Collection. Dr. Purcell having omitted to lay open and describe the condition of the unimpregnated cornu, I applied to the Board of Curators for permission to examine this part of the preparation, to determine if it were lined with a deciduous mem-

brane, and if the uterine orifice of the Fallopian tube were open. Permission was readily granted, and the necessary examination was made in the presence of Mr. Clift and Mr. Owen, but no trace of deciduous membrane could be detected, and even the internal membrane of the left cornu appeared to be wanting. It is impossible now to determine whether these membranes were removed artificially when the part was laid open by Mr. Hunter, after it came into his possession, or if they subsequently disappeared from decomposition during the lapse of fifty-nine years. Prior to the examination, the impression upon Mr. Clift's mind was, that when the left cornu was first laid open, a deciduous membrane had been discovered lining its surface.

Numerous experiments have been made on the lower animals, to determine the changes which take place in the ovaria subsequent to impregnation,—the period which is required by the germ or product of conception to traverse the Fallopian tube,—the power by which it is propelled into the cavity of the uterus, and the various forms it afterwards assumes in the progress of its development. In the human subject, the opportunities which physiologists have enjoyed of observing these changes in the uterine organs immediately after conception, have been so few, that the knowledge we possess of these changes is almost wholly derived from researches made on the deer or smaller quadrupeds.

Mr. John Hunter dissected the body of a young woman, who was supposed to be a month pregnant. The uterus was large and soft, and on its inner surface there was a pulpy substance, which was penetrated by the uterine vessels. This pulpy substance was so thin as to resemble the retina of the eye. The uterus was placed in a basin filled with clear water, and examined with the utmost care; but even with the help of a magnifier, the presence of the embryo could not be detected *.

Sir Everard Home relates the case of a young woman, who was supposed to have become pregnant eight days before death. The internal surface of the uterus was coated with an exudation of coagulable lymph, and a small ovum was concealed near the cervix uteri, in the midst of long filaments of coagulable lymph. The os uteri was completely closed with a firm gelatinous matter, and the two orifices at the superior angles of the uterus, by which this viscus communicates with the Fallopian tubes, were open. The embryo was detected by Mr. Bauer, with the help of the microscope. The cases I am about to relate, render it more than probable, that in this instance impregnation had taken place at least a month before the period supposed by Sir Everard Home †.

* Transactions of a Society for the Improvement of Medical and Chirurgical Knowledge, Vol. XI. p. 63. 1800.

† Philosophical Transactions, 1817, Part 2. p. 252.

Mr. Alexander Shaw has furnished me with the following interesting description of three specimens of the uterine organs after recent impregnation. These preparations, which I have carefully examined with him, were formerly in the Collection of Sir Charles Bell, and formed part of the Museum which was made under his superintendence for the London University, where they are now preserved. In all of these the orifices of the Fallopian tubes were visible at each angle of the fundus, or presented the same appearances which they exhibit in the unimpregnated condition of the organ.

1*st. Preparation.*—The woman from whom this uterus was taken, had her leg crushed by the wheel of a waggon. The limb was amputated and she died on the fourteenth day after the accident. She had informed the nurse, that she was in the sixth week of pregnancy. Upon examining the body the viscera of the pelvis were removed, and their blood-vessels injected with size and vermilion.

The uterus was nearly twice as large as it is in the unimpregnated state, and this organ together with the ovaries, the Fallopian tubes, and the alæ vespertilionis were in a remarkable manner loaded with blood. This vascularity was not like the effect of inflammation, but of excitement, the parts being soft and pliant, and without adhesion or extravasation. The left ovarium had a more turgid appearance than the right; it contained a corpus luteum, and a

bristle could be passed through the rent in the peritoneal covering at this part. The walls of the uterus were three quarters of an inch in thickness; there was an accumulation of mucus in the cervix and os tincæ, and the glandulæ Nabothi were enlarged.

Upon exposing the cavity of the uterus it was seen to be intensely vascular, the brilliancy of its colour having a resemblance to that which is produced when a portion of intestine in a young person is successfully injected. This vascularity was found to belong solely to the membrane which lined the inner surface of the uterus, and this being examined was discovered to be a true membrana decidua. Its surface was villous, and smooth in all its extent, it was confined to the body of the uterus; and the cervix accordingly, from wanting this vascular membrane, appeared almost free from injection, and nearly white.

The uterus was dissected with the view to expose the orifice of the left Fallopian tube; that is, on the same side on which the corpus luteum was discovered. When the angle at which the tube enters was laid open, a distinct channel was seen, formed in the deciduous membrane, and leading to the point where its opening is naturally found. This passage and the opening into the tube were free; so that a bristle could be introduced into the orifice and met with no obstruction, until it was fully inserted within the

walls of the uterus; here, owing to the calibre of the tube being naturally very small, and the course being somewhat difficult to follow, some force was required to be used. It appeared as the result of the examination, that the Fallopian tube, after traversing the parietes of the uterus, opened into the deciduous membrane with a distinct orifice; just as it does in the unimpregnated condition into the natural cavity of the womb.

Nothing that appeared like an ovum could be discovered, either in the Fallopian tube, or in the uterus, although it was searched for with care.

2*nd. Preparation.*—The young woman from whom the next specimen was obtained, terminated her existence by poison. The fundus of the uterus was turgid with blood, and upon the surface of the right ovarium was a red blotch resembling ecchymosis. The parts were therefore removed from the body and immersed in alcohol for more minute examination. The uterus was increased somewhat beyond its natural size. On opening the cavity, a deciduous membrane was discovered, compact as it is usually found to be, on the surface in contact with the uterus; but soft and velvety on the interior; and occupying the body of the uterus alone. There was a firm plug of mucus contained in the cervix and os tincæ.

The orifices of the Fallopian tubes were visible at

each angle of the fundus, or presented the same appearances which they exhibit in the unimpregnated condition of the uterus. A bristle could be introduced into them; but as in the former preparation, owing to the narrowness of the canal, there was an obstruction when it arrived at the part where the tube is enclosed within the parietes.

The ovarium of the right side presented an interesting appearance. Nearly one half of this body was turgid with blood, while the remaining part was of its natural whiteness. In the centre of the gorged part a vesicle was observed on the surface; which had burst and was more darkly coloured than the surrounding parts. When a section was made through this vesicle, the proper corpus luteum was exposed somewhat deeper. It was of the shape nearly of a kidney bean, was circumscribed, and could have been dug out from the ovary with the handle of the knife. It consisted of a clot of blood surrounded with a firm membrane. This enveloping membrane was about a tenth of an inch in thickness, and as it encompassed the clot of blood, it was thrown into numerous duplicatures on its inner surface. These duplicatures being white, while the blood inserted between them was of a dark brown colour, presented a contrast like what is seen in the molar teeth of the RODENTIA when the surface has been ground down to expose the layers of enamel, and this appearance of the clot has been described as resembling the oak leaf. This cavity containing the effused blood was distinct; and could be observed to

have a communication with the vesicle which was situated more superficially. This was by means of a canal about a sixth of an inch in length, and the borders of which were formed by a continuation of the same dense membrane which surrounded the corpus luteum. The calibre of this canal could only have permitted a bristle, of the smallest size, to lodge within it; yet it was easily discerned, owing to the stain of blood left in its centre, being contrasted with the whiteness of the margins.

Both Fallopian tubes contained a quantity of turbid fluid which resembled serum that had been thickly mixed with flocculi of lymph, and the same lymph adhered to the inner surface of the tubes. No appearance of an ovum could be observed.

3rd. Preparation.—The uterus of a young woman nineteen years of age, who destroyed herself by swallowing half a tea-cupful of sulphuric acid, and survived only twelve hours, was next submitted to inspection. Upon examining the uterus, it was found to be larger and softer than in the unimpregnated state. On slitting it open a gelatinous deposit was found in the cervix, and a deciduous membrane occupied the proper cavity. Adhering to the fleecy decidua and situated at the fundus, Sir Charles Bell found a small body distinguished by its putrescent colour, and this he imagined might be the ovum.

The orifices of the Fallopian tubes, as they enter the cavity of the uterus, presented the same appear-

ances which have been described in the two preceding preparations.

The right ovarium was large and plump; one half being of a dark colour, resembling ecchymosis. The peritoneal coat in the centre of this part, which was then turgid with blood, was torn and ragged, proving that the ovum had escaped. On making a section of this part, a circumscribed clot of blood resembling that which was described in the former preparation was exposed. On its inner surface the membrane by which it was surrounded, presented the same numerous folds, which were also seen in the preceding specimen, but the appearances were unfortunately destroyed for minute examination, owing to the parts having been steeped in water after the section was made, instead of their having been placed immediately in spirit of wine, which was done in the former case.

The fringed extremities of the Fallopian tubes were tumid and vascular, especially those on the right side.

The difficulty of determining the precise period of impregnation, must render all observations on the human ovum before the middle or near the end of the second month more or less vague and uncertain. After this time the organization of the ovum is so far advanced, that the membranous layers which envelope

the embryo, and the form of the embryo itself, can be clearly perceived with the naked eye. The amnion is then a transparent sac, which contains the embryo and the fluid in which it floats. The chorion covered with villosities on the external surface surrounds the amnion, but is separated from it a short distance by the interposition of a gelatinous fluid which is deposited in a very delicate reticular texture. There is a third membranous layer, viz. the decidua, which completely surrounds the chorion and connects the ovum with the inner surface of the uterus. This, as is well known, appertains not properly to the ovum itself, but is a production of the lining membrane of the uterus; for in cases of extra-uterine conception, the chorion and amnion alone envelope the embryo, and a deciduous membrane has been found lining the cavity of the uterus.

In the accompanying preparation, however, of Fallopian tube conception, which I assisted in removing from the body of a lady who died about the eighth or ninth week of pregnancy from rupture of the tube and internal hemorrhage, no organized deciduous membrane lined the inner surface of the uterus, but the whole of it was coated with a thin layer of soft flocculent albumen.

It is to Dr. William Hunter that the merit is due of having first accurately described and represented in his engravings of the gravid uterus, the disposition of the uterine and reflected deciduous membranes.

He has described the decidua as a very soft, tender, pulpy membrane, which lines the whole cavity of the fundus uteri, reaching to the beginning of the cervix, and passing a little way within the origin of the Fallopian tubes, at which place it is perforated by small openings. Besides that portion of decidua lining the cavity of the fundus uteri, another portion forms an external covering to that part of the chorion, which is not in contact at the inner surface of the placenta, and which he named decidua reflexa. The ovum lies between a part of the decidua vera, or that lining the inner surface of the uterus, and the decidua reflexa, both of which unite into one membrane at the edge of the placenta; or the decidua vera divides itself at the edge of the placenta into two laminæ, one of which passes between the placenta and the inner surface of the uterus, and the other forms the decidua reflexa, which covers the outer surface of the chorion as the pericardium does the heart.

When the decidua reflexa is beginning to pass over the chorion, there is at an early period of pregnancy, an angle formed between it and the decidua, which is often extremely thin and perforated with small openings, so as to look like a piece of lace. In proportion as pregnancy advances, the decidua reflexa becomes gradually thinner and thinner, so that at the fourth month, it forms an extremely fine layer covering the chorion. It comes at the same time more and more closely in contact with the decidua

which lines that part of the uterus to which the placenta is not fixed, till at length they adhere together *.

Dr. Hunter has offered no explanation of the manner in which the decidua reflexa is formed, and Dr. Baillie, who completed his description of the gravid uterus, admits that the manner in which the decidua envelopes the ovum has never yet been observed, and therefore can only be a subject of conjecture. The obscurity which has hitherto prevailed on this subject is probably referable in a great measure to the difficulty which has been experienced by anatomists of procuring the gravid uterus for dissection, at a sufficiently early period with the contents undisturbed. The extent of this difficulty will readily be estimated when I state, that the most early case of pregnancy which Dr. Hunter ever had an opportunity of examining in the dead body was of three complete months, and that his description of the contents of the gravid uterus before this period, was drawn entirely from recent ova expelled in abortion.

The greatest diversity of opinion still prevails respecting the structure and mode of formation of the deciduous membranes, though they have been carefully investigated since the time of Dr. Hunter, by

* An Anatomical Description of the Human Gravid Uterus, by W. Hunter, M.D. pp. 79—83. London, 1794.

many distinguished physiologists. Neither Lobstein, Krummacher, Gardien, Breschet, Dutrochet nor Velpeau, have been able to discover the openings in the decidua, corresponding with the orifices of the Fallopian tubes, and the last of these authors has concluded from his researches, not only that the decidua invariably forms a shut sac in the uterus before the descent of the ovum, but that it is an inorganic layer, and wholly destitute of blood-vessels during the entire period of gestation. According to this view of the disposition of the parts, it is supposed that as the ovum passes through the Fallopian tube into the uterus, it pushes before it the deciduous membrane lying across the orifice of the tube, and thus acquires the thin membranous covering termed decidua reflexa. "L'ovule, après avoir parcouru la trompe, deprime necessairement la membrane caduque pour se glisser entre elle et l'uterus, à la surface interne duquel il finit par se coller : des ce moment, la membrane préexistante se trouve formée de deux portions ; l'une, tres grande, tapissant tout l'interieur de la matrice, à l'exception du point qui est en contact avec le germe, porte le nom de caduque uterine ou interne ; l'autre, tres petite, deprimée par la moitié inferieure de la vesicule fecondée qu'elle enveloppe, constitue la caduque reflechie, interne ou l'epichorion. L'etendue de la première augmente en même proportion que celle de l'uterus, et l'agrandissement de la seconde suit, de toute necessité, l'acroissement du germe. Aussi la cavité qui les separe, et qui n' est autre que la cavité deformée de l'ampoule primitive, est elle

d'autant plus considerable qu' on s'eloigne moins des premiers temps de la gestation." *

Dr. Burns, who has enjoyed several opportunities of examining the contents of the gravid uterus within a month after conception, has given the same mechanical and erroneous explanation of the formation of the decidua reflexa. "In every case," he observes, "the decidua consisting of two layers is completely formed before the ovum descends. Where the embryo passes down through the tube, it is stopped when it reaches the uterus by the inner layer which goes across the aperture of the tube, and thus would be prevented from falling into the cavity of the uterus, even were it quite loose and unattached. By the growth of the embryo, and the enlargement of the membranes this layer is distended and made to encroach upon the cavity of the uterus, or, more correctly speaking, it grows with the ovum. This distension or growth gradually increases, until at last the whole of the cavity of the uterus is filled up, and the protruded portion of the inner layer of the decidúa comes in contact with that portion of the uterus itself which remains attached to the outer layer." †

On the 10th of March, 1832, a young woman who was in the second month of pregnancy poisoned herself with oxalic acid. The uterine organs were re-

* Traité Elementaire des Accouchemens, Tom. I. p. 232.

† Principles of Midwifery. London, 1820. P. 184.

moved from the body without disturbing their contents by W. B. Hutchinson, Esq. house-surgeon to the St. Mary-le-bone Infirmary, and to his kindness I am indebted for the preparation of the parts now exhibited to the Society, and for the opportunity which has so seldom been enjoyed by anatomists of dissecting the gravid uterus before the third month of conception. Both Fallopian tubes in this case were pervious, and the ovum being attached by the placenta to the inferior segment of the uterus, it was obvious that it could not have pressed before it the decidua reflexa in the manner usually represented.

Description of the Uterus and appendages of a Young Woman who poisoned herself in the Second month of pregnancy.

The uterus had acquired double the size which it usually exhibits in the unimpregnated state. It was five inches long, three and a half in the greatest lateral direction, and two inches in the antero-posterior diameter.

A longitudinal incision was carried down the middle of the posterior surface, crossed by a transverse one parallel to the entry of the Fallopian tubes. The thickness of the parietes of the uterus, though greater than in the quiescent state, were not proportionate to the general increase in the dimensions of the viscus, —they were four lines at the fundus and six lines at the cervix, gradually increasing towards that part;

the chief difference was observable in the already enlarged size of the uterine venous sinuses.

The deciduous membrane, which closely adhered to the inner surface of the uterus, was then laid open by two incisions parallel with the longitudinal and transverse incisions previously made in the parietes of the uterus. The cavity of the uterus being exposed, the ovum, about the size of a pullet's egg, came into view, and was observed to be situated towards the lower part of the uterus. The part of the cavity to which it adhered was included between two parallel lines, drawn, the one transversely across the uterus at the distance of half an inch below the entry of the Fallopian tubes, the other at two inches distance from the os tincæ. Consequently the ovum was situated altogether below the entry of the Fallopian tubes, and was unattached both at its upper and lower part, leaving a free space or canal between it and the os tincæ corresponding to the shape of the elongated cervix, and a much larger cavity between the upper part of the ovum and the fundus uteri. But as this latter space is not only inexplicable on the received theories of the formation of the decidua reflexa, but directly at variance with these, it demands a particular and minute description.

Intervening between the superior and unattached surface of the ovum and fundus uteri, was a broad but shallow cavity measuring three inches in the lateral and one inch and a half in the antero-posterior

diameter, and from one to two lines in depth. The upper concave surface of the cavity formed by the decidua lining the fundus uteri, or decidua vera, was irregular and slightly reticulated. The inferior convex surface formed by the decidua covering the ovum, or decidua reflexa, was perfectly smooth, resembling the external serous surface of the uterus. Into this cavity the Fallopian tubes freely opened by palpable orifices; that on the left side by which the ovum had entered the uterus being rather more than a line in diameter, that in the right rather less. The cavity thus formed between the decidua lining the fundus uteri and the decidua covering the upper and unattached portion of the ovum was filled with a red-coloured serous fluid.

The ovum was next laid open by an incision through the chorion parallel with the longitudinal incision of the uterus, and the amnion enclosing the embryo was brought into view. The placenta was situated principally over the cervix and posterior part of the body of the uterus, and the decidua closely adhering to the placenta passed across the upper part of the cervix uteri in the form of a thick reticular membrane. The decidua was then observed to extend upward between the uterus and chorion every where firmly connecting these together as high as the entrance of the Fallopian tubes. From this point the deciduous membrane was spread out in two different directions, viz. over the upper convex and unattached surface of the ovum, and over the whole concave surface of the fundus uteri, so as to form the cavity above described

into which the Fallopian tubes freely opened. The deciduous membrane interposed between the ovum and uterus exhibited the usual degree of development and of organization. Where it passed off from the uterus to cover the upper surface of the ovum, it was somewhat thicker than elsewhere, and was divisible into two distinct layers. The tufts of vessels of which the placenta is constituted were more distinct from each other than they subsequently become, and they filled the entire space between the chorion and decidua. The appearance of a division of the placenta into a fœtal and maternal portion did not exist. The different parts of this interesting and most beautiful preparation have been faithfully represented by Mr. Perry, in the accompanying drawing *.

If the statements of the authors above alluded to and the generally received opinions respecting the formation of the decidua reflexa be well founded, it would follow, that in all cases the ovum would attach itself to the uterus by the placenta, either directly over the edges of the orifice of the Fallopian tube, through which it had descended, or to its immediate vicinity, and that the deciduous membrane would never be found interposed between the uterus and placenta, as it invariably is. The facts which I have now adduced, clearly demonstrate, that the Fallopian tubes are open in the early months of gestation; that the ovum may attach itself by the placenta to the fundus

* See Plate III.

body, cervix or over the os uteri, and that the deciduous membrane forms neither a shut sac nor inorganic layer, prior or subsequent to the arrival of the ovum in the cavity of the uterus. These circumstances are also strictly in accordance with the fact that when the ovum can first be perceived, it lies loosely imbedded in the soft flocculent albuminous matter which at this period of gestation coats the inner surface of the uterus, and that this pulpy semifluid matter becomes gradually converted into those delicate organized membranous layers, by which the attachment of the ovum to the uterus is so firmly secured during the whole period of pregnancy. The albuminous substance interposed between the uterus and ovum becomes the decidua uteri or decidua vera, while the albumen which envelopes the unattached hemisphere of the ovum becomes the decidua reflexa. To whatever part of the uterus the ovum adheres by the placenta, its relation to the deciduous membranes will be the same, the decidua vera forming the connecting membrane between the ovum and uterus, and the decidua reflexa covering only that part of the chorion which hangs loose within the cavity of the uterus.

From the circumstances now detailed, it also follows that the names decidua uteri and decidua reflexa are improper, in so far as they are founded on speculative ideas regarding the mode in which these membranes are formed, and which, if not positively erroneous, are at least by no means demonstrated. It

would be preferable to distinguish these membranes not in this hypothetical manner, but from their anatomical relations, which must be true, whatever be the fate of our conjectures; and I therefore propose to denominate them respectively decidua uteri and decidua ovuli or uterine and ovuline decidua *.

At the end of the fourth month of gestation, when the ovum has enlarged so as to fill the entire cavity of the uterus, the decidua uteri and the decidua ovuli coalesce, and during the remainder of pregnancy form a thin, soft, pulpy membrane which is closely united to the inner surface of the uterus, by numerous small tortuous blood-vessels and flocculent fibres. At this period also the villosities of the chorion have disappeared, where the placenta does not exist, and the amnion, the chorion, and the decidua have become so firmly adherent to one another that they constitute a membranous sac consisting actually but of one layer, though susceptible of being artificially divided into three distinct laminæ. M. Velpeau asserts, that the decidua uteri, and decidua ovuli remain distinct membranes until the end of pregnancy, but in seven gravid uteri near the full period, which I have examined, I have never perceived more than three concentric layers in any part of the fœtal membranes. The existence of numerous blood-vessels, proceeding from the lining membrane of the uterus to the de-

* The term ovuline decidua I have adopted at the suggestion of my ingenious friend Mr. Owen.

cidua, which has also been denied by the same writer, is clearly demonstrated by the preparations of the gravid uterus in the Royal College of Surgeons in London, and it scarcely admits of a doubt, that these vessels serve not merely to supply nourishment to the membranes which envelope the fœtus, but that they enable the amnion to secrete the fluid contained within its cavity. The numerous small arteries which proceed from the inner surface of the uterus to the decidua covering the placenta are also, I conceive, solely destined to perform the function of supplying this organ with nourishment, and not, as has generally been supposed, to effect certain changes in the fœtal blood as it circulates in the vessels of the placenta.

In a paper recently published on the structure of the human placenta and its connexion with the uterus, I have given the following concise description of the placental decidua, and of the appearances in the corresponding part of the uterus. This description was drawn from a careful examination of six gravid uteri, in which the natural relation of the placenta to the uterus had not been destroyed by the forcible injection of extraneous matter into the spermatic and hypogastric arteries ; and its accuracy appeared to be confirmed by the appearances observed in the vascular preparations of the gravid uterus in the Hunterian Museum at Glasgow, and Royal College of Surgeons in London, and by dissections of the uterus and placenta, performed under water, by Mr. Owen.

"At the circumference of the placenta, the decidua separates from the chorion and amnion to pass between the uterus and placenta, and thus forms a complete membranous septum, which is interposed betwixt these organs. The chorion and amnion cover the fœtal surface of the placenta; and between these two membranes and the decidua lie the ramifications of the umbilical vein, and arteries subdivided to an almost indefinite extent, and connected together by white slender filaments running in various directions. The placenta thus consists solely of a congeries of the umbilical vessels, covered on the fœtal surface by the chorion and amnion, and on the uterine surface by the deciduous membrane, and inclosed between these membranes; it adheres to the fundus, or some part of the uterus by innumerable flocculent fibres and vessels.

"On detaching the placenta carefully from the uterus, the deciduous membrane is found to adhere so closely to the umbilical vessels which it covers, that it is impossible to remove it without tearing these vessels. With the fibres uniting the placental decidua to the uterus are mingled small blood-vessels, proceeding from the inner membrane of the uterus to the decidua; and these vessels, though more numerous at the connexion of the placenta with the uterus, exist universally throughout the whole extent of the membrane. There is no vestige of the passage of any great blood-vessel, either artery or vein, through the

intervening decidua from the uterus to the placenta; nor has the appearance of the orifice of a vessel been discovered, even with the help of a magnifier, on the uterine surface of the placenta. This surface of the placenta deprived of the deciduous membrane presents a mass of floating vessels, its texture being extremely soft and easily torn; and no cells are discernible in its structure, by the minutest examination.

"At that part of the surface of the uterus to which the placenta has been adherent, there are observable a great number of openings leading obliquely through the inner membrane of the uterus, and large enough to admit the point of the little finger; their edges are perfectly smooth, and present not the slightest appearance of having been lacerated by the removal of the placenta. In some places they have a semilunar or elliptical form, and in others they resemble a double valvular aperture. Over these openings in the inner membrane of the uterus, the placenta, covered by deciduous membrane, is directly applied and closes them in such a manner that the maternal blood, as it flows in the uterine sinuses, cannot possibly escape either into the cavity of the uterus or into the substance of the placenta.

"When air is forcibly thrown either into the spermatic arteries or veins, the whole inner membrane of the uterus is raised by it; but none of the air passes across the deciduous membrane into the placenta, nor does it escape from the semilunar

openings in the inner membrane of the uterus, until the attachment of the deciduous membrane to the uterus is destroyed. There are no openings in the deciduous membrane corresponding with these valvular apertures now described, in the internal membranes of the uterus.

"If a placenta be examined which has recently been separated from the uterus in natural labour without any artificial force having been employed, its surface will be found uniformly smooth and covered with the deciduous membrane; which could not be the case did any large vessels connect it with the uterus. The placenta, in a great majority of cases, is also detached from the uterus after labour, with the least imaginable force; which would be impossible if a union by large blood-vessels, possessing the ordinary strength of arteries and veins actually existed. Besides a vascular connexion of such a kind would be likely to give rise, in every case, to dangerous hemorrhage subsequent to parturition, a circumstance not in accordance with daily experience." *

The accuracy of the preceding anatomical description of the relations of the uterus and placenta, I have recently had an opportunity of confirming to the fullest extent, by examining (through the kindness of Mr. Alexander Shaw) a gravid uterus in the sixth month of pregnancy. The experiments of the

* Philosophical Transactions, 1832. Part I. p. 57.

Hunters, of Dubois, Chaussier, Beclard, Williams, Biancini, Burns, and others, prove that if size, mercury, oil of turpentine, &c. be injected into the spermatic, or hypogastric arteries of the gravid uterus, they will pass not only into the substance of the placenta, but sometimes into the blood-vessels and organs of the fœtus itself. To those observers who have adopted the views of the Hunters, and who neglect, or obstinately refuse, to examine the connexions of the uterus and placenta, before they have been disturbed by the forcible injection of extraneous matters into the uterine blood-vessels, such experiments will probably be considered as demonstrating the existence of a cellular structure in the placenta, and of a free communication by great arteries and veins between these cells and the uterus. That no such communication, however, exists in nature, and that the appearances produced by injection are completely fallacious, may readily be demonstrated, by an examination of the parts in the manner I have pointed out. The numerous small tortuous blood-vessels which proceed from the uterus to the placenta, are nutrient vessels of the placenta, and never terminate in cells, and the uterine sinuses do not penetrate the decidua, but open into the cavity of the uterus by smooth and large valvular-like orifices in its lining membrane. The whole of the blood sent to the uterus by the spermatic and hypogastric arteries, except the small portion supplied to its parietes, and to the membrana decidua by the inner membrane of the uterus, flows into the uterine veins and sinuses, and after circulating through them,

is returned into the general circulation of the mother, by the spermatic and hypogastric veins, without entering the substance of the placenta. The deciduous membrane being interposed between the umbilical vessels and the uterus, whatever changes take place in the fœtal blood, must result from the indirect exposure of this fluid, as it circulates through the placenta, to the maternal blood flowing in the great uterine sinuses.

POSTSCRIPT.

While correcting the press, I received from Charles Millard, Esq., Demonstrator of Anatomy in the School of Webb Street, the following interesting description of the appearances which he observed in a gravid uterus of seven months.

"Dean Street, Southwark,
September 18th, 1832.

"MY DEAR SIR,

"As concurrent testimony on any, even the clearest subjects, is sometimes of use, I beg to forward to you the following account of the dissection of a healthy uterus, at about the seventh month of pregnancy, which I had an opportunity of examining through the kindness of Dr. Holroyd of Harley Street, who obtained the specimen from the body of a woman who died of cholera. The parts were examined without any previous injection or other preparation, that every thing might be seen in its natural state.

" On making an incision through the anterior wall of the uterus, the attention was immediately arrested by the large size of the uterine veins, especially of those in the neighbourhood of the placenta. The right side of the anterior wall of the uterus was then carefully turned back, and with such ease as to convince me that no large vessels were torn through: the tunica decidua was now distinctly seen passing behind the placenta, and it was also observed to pass over the orifice of the Fallopian tube. The other side of the uterus was then carefully examined under water, principally with a view to ascertain the direction and termination of the uterine veins, and the connexion that exists between the uterus and placenta. This examination completely coincided with your description. The uterine veins passed in an oblique direction as regards the placenta, and not immediately towards it, and in no instance could they be traced into its structure, for whether they were followed from the external to the internal surface of the uterus, or in the opposite direction, they were found to present a number of large valvular openings, some of an elliptical and some of a semicircular form, situated in the sides of the veins, and having no corresponding openings on the outer surface of the placenta, but closed by the deciduous membrane. All these openings had distinct, well defined edges, formed, apparently, by a duplicature of the lining membrane of the uterus, and quite unlike ruptured vessels; indeed, as I have before stated, none of these veins could be followed into the placenta, even by the

most careful examination. But both arteries and veins, not larger than a bristle, were readily traced from the surface of the uterus to the tunica decidua covering the uterine surface of the placenta, where they ramified very minutely. Some of these were distended by inflating the large uterine veins, but no air could be made to pass from these vessels into the substance of the placenta, although the inner membrane was distinctly raised by it. The uterus was farther connected to the placenta by a quantity of pulpy cellular membrane, which easily broke down under the finger.

"Believe me, my dear Sir,

"Yours very truly,

"To Dr. Lee." "C. MILLARD."

G. Woodfall, Printer, Angel Court, Skinner Street, London.

Jrs.ᵉ Perry del et lithog.

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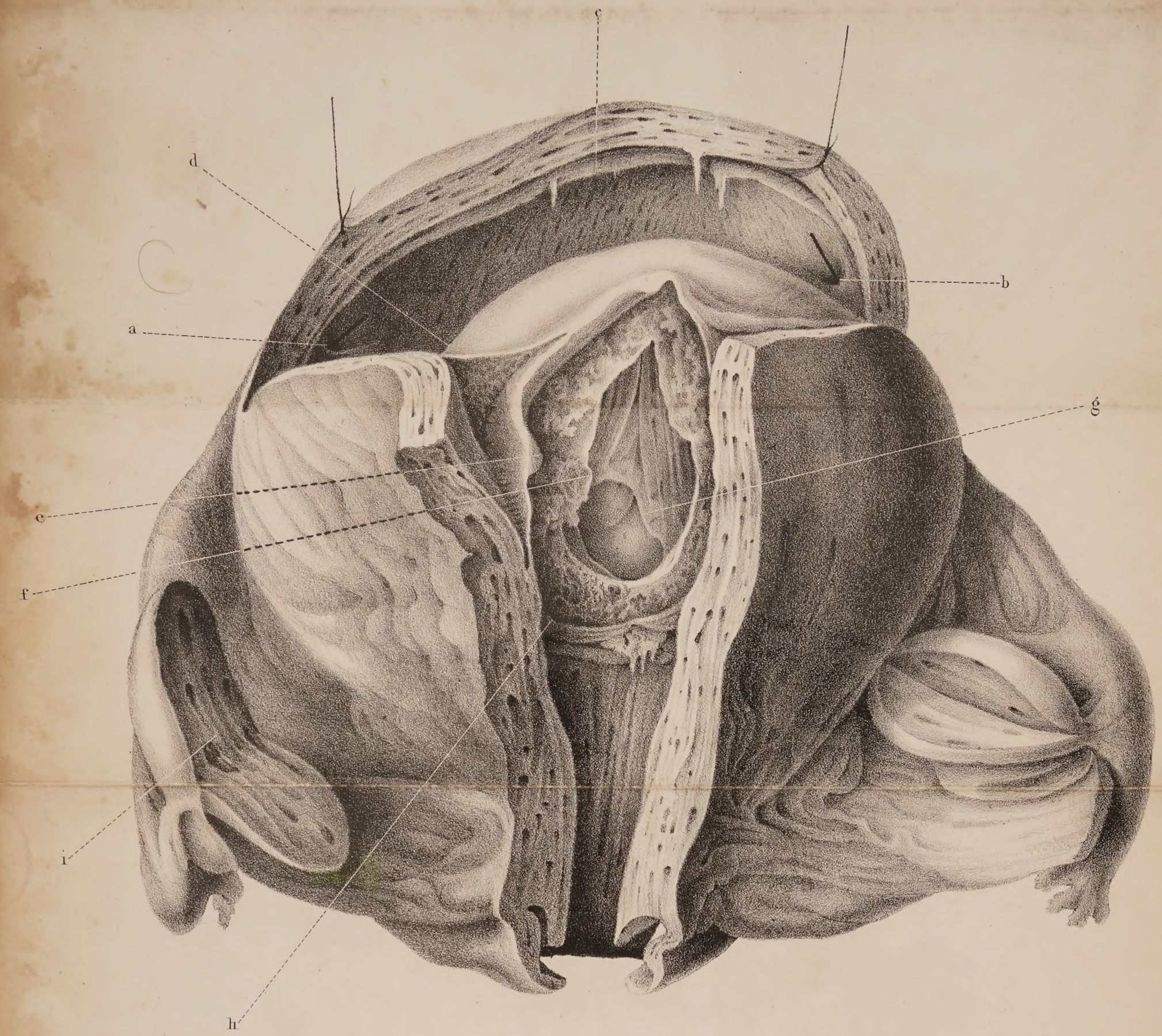

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